Chemical Tests for Intoxication

Training Course for Breath Test Operator Certification

Indiana State Department of Toxicology
550 West 16th Street
Indianapolis, Indiana 46202
Telephone: 317-921-5000

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Chemical Tests for Intoxication

Training Course for Breath Test Operator Certification

Schedule

0800 – 0815 ILEA Welcome / Orientation

0815 – 0830 Dept. of Toxicology / Indiana Administrative Code (IAC) 260

0830 – 0925 Pharmacology and Toxicology of Alcohol / Evidence Submission

0925 – 0935 Break

0935 – 1030 Legal Aspects of Breath Testing for Ethanol / Recent Case Law

1030 – 1145 Instrumentation and Approved Method for Breath Test Analysis

1145 – 1300 LUNCH

1300 – 1700 Laboratory Exercises / Evaluations / Written Examination / Final Laboratory Exercise

Breaks will be provided between blocks of instruction as time permits.

Chemical Tests for Intoxication
Training Course for Breath Test Operator Certification

Course Schedule

(See Course Schedule – page 3)

Requirements:

Must be present for entire course

Must obey ILEA Rules

Course Staff:

Inspectors	Tom Pierce Lou Brown Dwight Holbrook
Toxicologist	Dr. Sheila Arnold Email: sarnold1@isdt.in.gov
General Counsel	Teri Kendrick tkendrick@isdt.in.gov

State Department of Toxicology

Objective:

To provide the training required under 260 IAC 2-2-2 for breath test operator certification.

Duties of the Department:

IC 10-20-2 (enacted 2011)

- Conduct analyses for poisons, drugs, and alcohols upon human tissues and fluids
- Report analytical findings of the department
- Consult with Indiana coroners regarding interpretation of analytical findings
- Furnish expert testimony
- Provide instruction in toxicology to law enforcement officers
- Certify law enforcement officers as required by law for administration of breath and other chemical tests
- Provide instruction and technical assistance to prosecutors and defense counsel regarding ISDT lab results
- Provide instruction to judges on toxicology and alcohol and drug testing

IAC 260

A complete copy of Title 260 is available at:

http://www.in.gov/legislative/iac/iac_title?iact=260

See Article 2 of Title 260 for current provisions.

IAC Title 260 regulates:

Selection, training, certification, and recertification of breath test operators

Selection, inspection, and certification of breath test instruments and chemicals

Approved methods for administering breath alcohol tests

Reference: IC 9-30-6-5

260 IAC 2-2-1 Selection of breath test operators

Must be employed by a law enforcement agency

"Law enforcement agency" means an agency or department with authority to apprehend criminal offenders

260 IAC 2-2-2 Training of breath test operators

The breath test operator certification training course includes training in:

- Pharmacology and toxicology of ethanol
- Legal aspects of breath testing for ethanol
- Theory, operation, and care of breath test equipment
- Use of breath test instrument using known ethanol-water or ethanol-gas standards

260 IAC 2-2-3 Recertification of breath test operators

- Must be recertified at least every two years from month of certification or recertification. **Your operator card expires on the last day of the month.**
- Must demonstrate competence by passing an examination approved by ISDT
- A person who fails the recertification exam may be given a second exam if previous certification has not been expired for more than 30 days
  - During time between first and second exams, person is not certified
- Director may suspend or revoke certification at any time

260 IAC 2-2-4 Authorization of certified breath test operators

- Administer breath tests
- Make replacements and adjustments to breath test instruments not related to calibration

260 IAC 2-3-1 Selection of breath test equipment

The department shall select breath test equipment for use for evidentiary breath testing to ensure the accurate analysis of breath specimens for the determination of breath ethanol concentrations.

- Equipment selected by the department must analyze breath samples and report a numerical value expressed as grams of ethanol per two hundred ten (210) liters of breath.

260 IAC 2-3-2 Inspection of breath test instruments

- ISDT will inspect each instrument at least every 180 days
- If the location of the instrument is changed, it must be inspected and certified prior to use
  - Moving the instrument past the length of its electrical cord is a location change
- Intox EC/IR II shall not deviate more than 5% or 0.005, whichever is greater, from the certified value of the ethanol-water standard or the value adjusted for ambient barometric pressure of the certified ethanol-gas standard

*******Permitted deviation is plus or minus 5% or 0.005, whichever is greater.

Example: If the target value ("dry gas target") is 0.077, the instrument reading of the ethanol content of the dry gas must fall within the range of 0.072 to 0.082.

Indiana Code

- ISDT sends certifications of breath test operators and instruments to the circuit court clerks.

  IC 9-30-6-5(b): Failure to send a certificate does not invalidate any test.

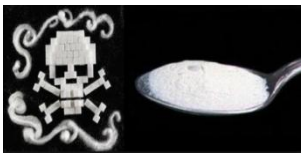
- ISDT maintains records of certifications at its administrative office

Pharmacology and Toxicology of Alcohol

Pharmacology: Study of mechanisms by which drugs alter biological systems in an attempt to improve health and alleviate disease

Toxicology: Study of the adverse effects of chemicals on living organisms

Principle: "All substances are poisons; there is none that is not a poison. The right dose differentiates a poison from a remedy." Paracelsus



Toxicity Rating	Dose (mg/kg b.w.)	For Average Adult
1. Practically non-toxic	More than 15,000	More than 1 quart
2. Slightly Toxic	5000-15,000	1 pint-1 quart
3. Moderately Toxic	500-5000	1 ounce-1 pint
4. Very Toxic	50-500	1 teaspoon-1 ounce
5. Extremely Toxic	5-50	7 drops-1 teaspoon
6. Supertoxic	Less than 5	Less than 7 drops

Forensic Toxicology: Study of the effects of chemical substances on criminal behavior or results.

Substances
- Alcohol
- Other drugs
- Poisons

Testing
- Laboratory
- Breath Alcohol

Interpretation
- OWI
- Postmortem

History of Ethanol Testing

Sir Edward Mellanby (1884 - 1955): Established relationship between BAC and intoxication. (1919)

Erik M.P. Widmark (1889 - 1945): Described mathematical terms (rho and beta) for alcohol distribution and elimination. (1932)

Goran Liljestrand (1889 - 1968): Determined that expired air contained an ethanol concentration about 1/2000 that of blood. (1931)

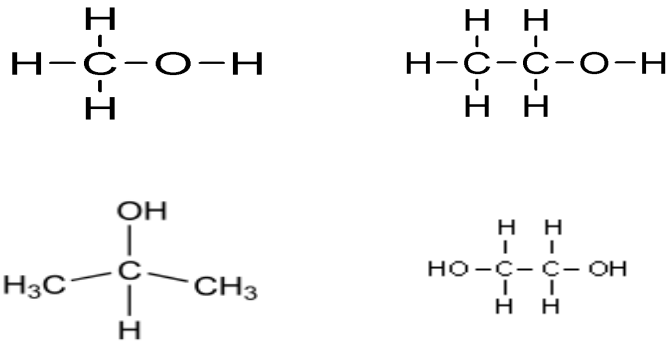
Rolla Harger (1890 - 1983): Developed first practical breath test instrument (Drunkometer).

Robert Forney (1916 - 1997): First Director of State Department of Toxicology. (1957)

Robert Borkenstein (1912 – 2002): Conducted the first study to demonstrate the relationship between BAC and the likelihood of being in a motor-vehicle accident. (1964)

Types of Alcohols

Alcohols are characterized as a chemical class of molecule having a carbon atom bound to an oxygen-hydrogen (-OH) bond.



Methanol

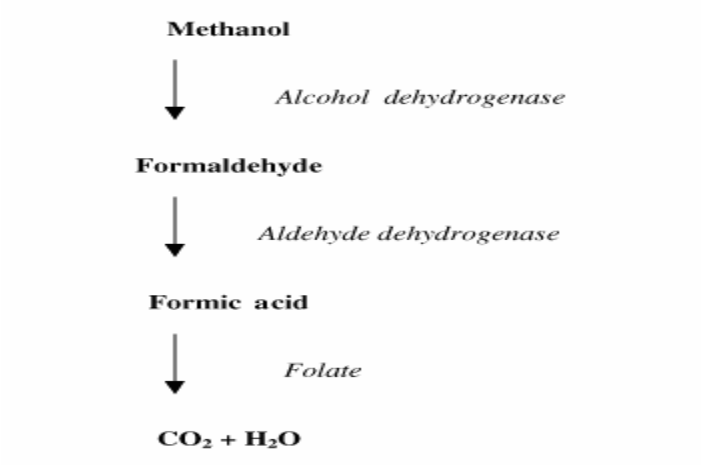
Wood alcohol

All types of alcohol can cause CNS impairment
Methanol intoxication symptoms mirror those of EtOH

Extremely toxic even at low doses (0.02-0.03 g%)

MeOH inhalation defense

Methanol Metabolism



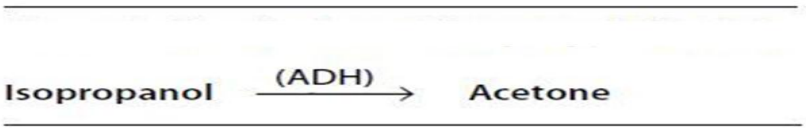
Isopropanol

Rubbing alcohol

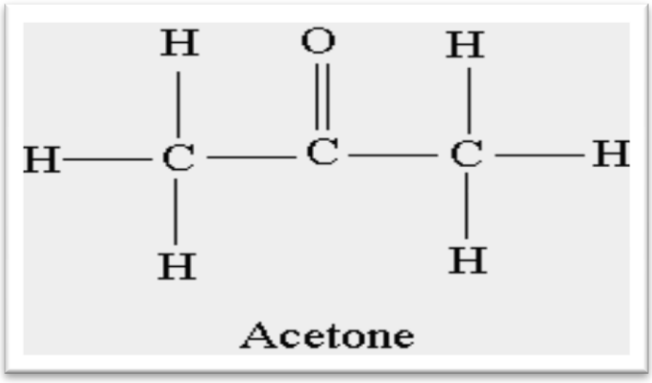
All types of alcohol can cause CNS impairment
Isopropanol intoxication symptoms mirror those of EtOH

Toxic (>0.04%) – metabolized to acetone
Acetone causes CNS impairment as well
Acetone longer $t_{1/2}$

Isopropanol Metabolism



Acetone (ketone)



Sources of Acetone

Metabolite of Isopropanol

Solvent

Compromised liver function

Fatty liver

Cirrohosis

Diabetic Ketoacidosis

Starvation Ketoacidosis

Ethylene glycol

Component in antifreeze

Considered a polyalcohol

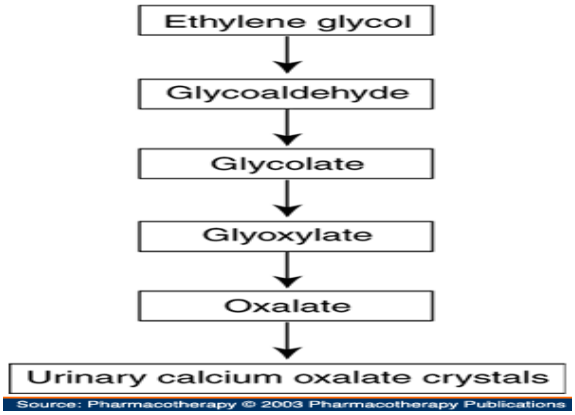
Can also cause CNS impairment

Extremely toxic

Metabolites lead to severe acidosis

Metabolites can also lead to acute renal failure

Ethylene glycol Metabolism



Alcoholic Beverages

These beverages contain the same amount of ethanol:

One beer (12 oz, 4.5%)

One glass of wine (4.5 oz, 12%)

One mixed drink (containing 1.5 oz, 80 proof)

The total amount of ethanol consumed, not the type of beverage, is important.

Fermentation

A biological process in which sugars such as glucose, fructose, and sucrose are converted into cellular energy—this conversion produces ethanol and carbon dioxide. Because yeasts perform this conversion in the absence of oxygen, ethanol fermentation is classified as an anaerobic process.

Distillation

A physical process by which ethanol is separated and purified from a mixture.

Pharmacokinetics of Ethanol = what the body does to the drug.

Absorption: how it gets in

Distribution: where it goes

Metabolism: what happens to it

Elimination: where/how it leaves

ADME

Absorption

Mouth - Esophagus - Stomach - Intestine

Mouth:

Ethanol can be absorbed from the mouth, but very slowly; not significant.

A mouth rinsed with a solution containing ethanol will be alcohol-free in about 10 minutes (MOUTH ALCOHOL).

Stomach:

Ethanol can be absorbed directly from the stomach.

The stomach normally absorbs about 20% of ingested ethanol.

Stomach has thick lining, not really designed for absorption.

Small size of EtOH permits its passage via diffusion.

Intestine:

The upper intestine normally absorbs about 80% of the ingested ethanol.

The lower intestine and lower bowel readily absorb ethanol. Most ethanol is absorbed, however, from the upper GI tract before it reaches the lower intestine.

Skin:

Ethanol has not been demonstrated in the blood as a result of absorption through the skin. If it is absorbed, the rate is lower than the rate of metabolism.

EtOH absorption defense

Absorption rate through the skin<Elimination rate

Factors that affect rate of ethanol absorption:

Presence of food in the stomach - ***** Most Important *****

- Most foods will delay gastric emptying - ↓ absorption

Exercise - Effects vary; some studies show no effect

- Mild exercise can increase gastric emptying - ↑ absorption
- Strenuous exercise can decrease gastric emptying - ↓ absorption

Excitement or fear - ↓ absorption

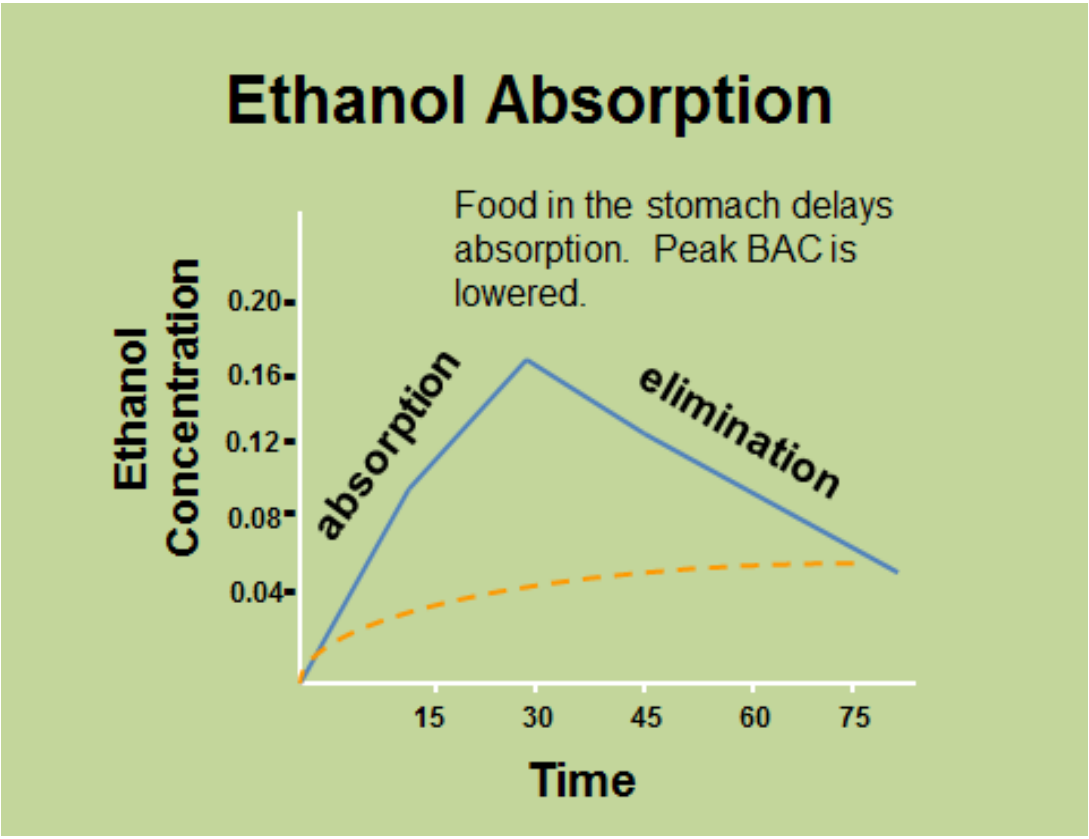
Drugs - Effects vary

Smoking - ↓ absorption

GI pathologies - Effects vary, depending on the pathology

The rate of ethanol absorption depends on the rate of gastric emptying. Increased gastric emptying will increase absorption of ethanol and result in higher peak blood/breath alcohol concentrations. Decreased gastric emptying will decrease absorption of ethanol and result in lower peak blood/breath alcohol concentrations.

Ethanol Absorption



Distribution

Ethanol is soluble in water and is distributed throughout the body based on water content.

Tissues and organs that have the highest concentration of water will have the highest concentration of ethanol.

Widmark's rho or Widmark's r

The available water content of an average male is 68%; of an average female, 55%. **For the same amount of ethanol per body weight, a woman will have a higher concentration of ethanol.**

Ethanol Metabolism

EtOH is metabolized by both the stomach and by the liver; primarily by the liver.

Some EtOH is metabolized by these organs before reaching the general circulation.

The amount of EtOH ingested, therefore, may NOT accurately reflect the calculated BAC.

Effects of Pathological Conditions on Ethanol Metabolism

Fatty Change (steatosis)

Alcoholic Hepatitis

Cirrhosis of the Liver

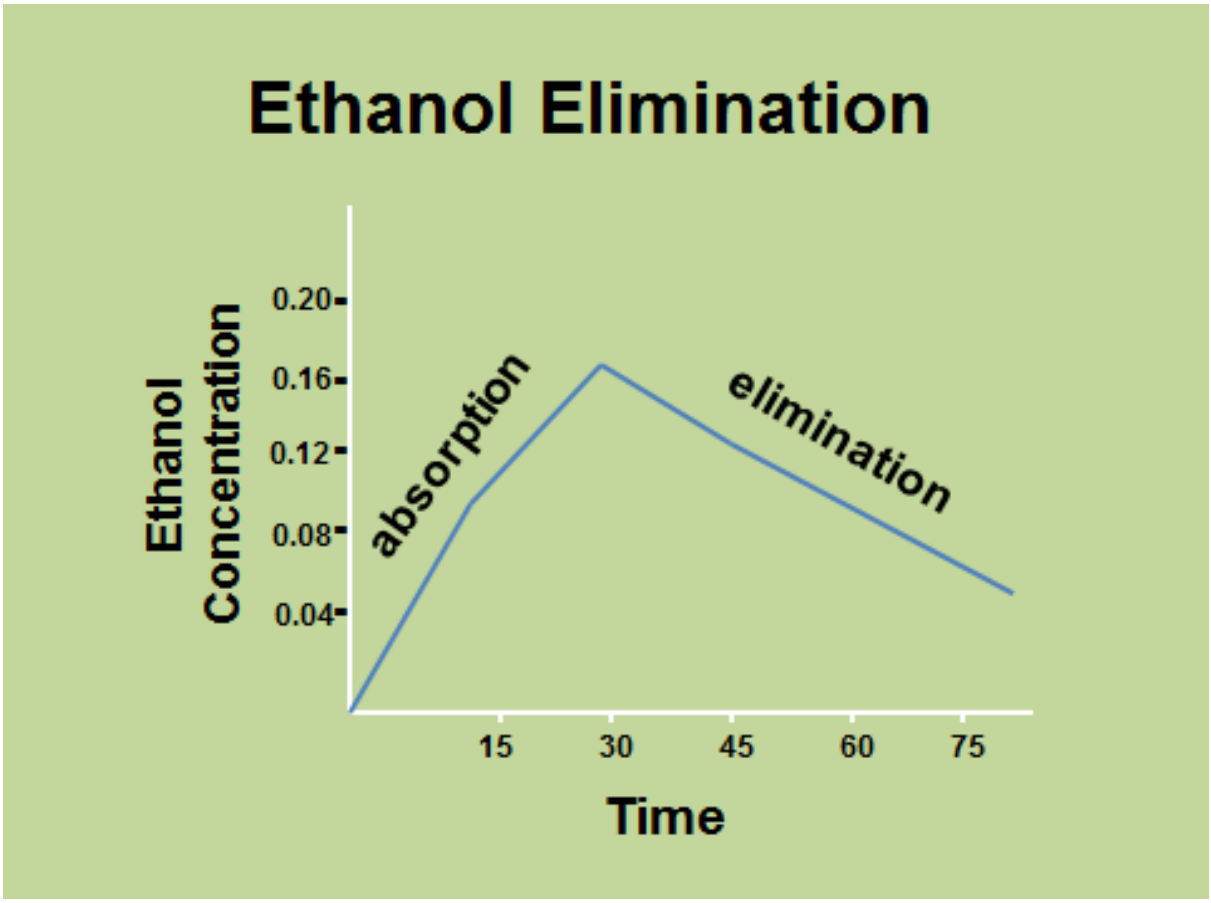
Diabetes

Metabolism and Elimination

Metabolism:

Approximately 90 - 95 % of absorbed ethanol is metabolized by the body prior to elimination, mostly in the liver.

The rest is excreted unchanged in urine, sweat, tears, milk, and breath.



Elimination of Ethanol

Ethanol disappears from the blood at a constant rate, termed Widmark's ß (beta) factor.

Rate varies between individuals.

Average rate - 0.015-0.019 g% per hour

Elimination ranges from 0.010-0.025 g% per hour

Alcoholics and binge drinkers can eliminate at a rate of 0.035 g% per hour

Toxicology of Ethanol

Ethanol is a CNS Depressant.

CNS = Central Nervous System

Depressant = slows function

Even though impairment has been correlated to blood and breath alcohol concentrations, impairment is caused by ethanol in the BRAIN.

Four primary types of impairment

1. Loss of judgment and self-control
2. Impairment of vision and hearing
3. Clumsiness of voluntary muscles
4. Decreased awareness of surroundings

STAGES OF ACUTE ALCOHOLIC INFLUENCE/INTOXICATION

BLOOD-ALCOHOL CONCENTRATION grams/100 mL	STAGE OF ALCOHOLIC INFLUENCE	CLINICAL SIGNS/SYMPTOMS
0.01-0.05	Subclinical	Influence/effects usually not apparent or obvious Behavior nearly normal by ordinary observation Impairment detectable by special tests
0.03-0.12	Euphoria	Mild euphoria, sociability, talkativeness Increased self-confidence; decreased inhibitions Diminished attention, judgment and control Some sensory-motor impairment Slowed information processing Loss of efficiency in critical performance tests
0.09-0.25	Excitement	Emotional instability; loss of critical judgment Impairment of perception, memory and comprehension Decreased sensitory response; increased reaction time Reduced visual acuity & peripheral vision; and slow glare recovery Sensory-motor incoordination; impaired balance; slurred speech; vomiting; drowsiness
0.18-0.30	Confusion	Disorientation, mental confusion; vertigo; dysphoria Exaggerated emotional states (fear, rage, grief, etc) Disturbances of vision (diplopia, etc.) and of perception of color, form, motion, dimensions Increased pain threshold Increased muscular incoordination; staggering gait; ataxia Apathy, lethargy
0.25-0.40	Stupor	General inertia; approaching loss of motor functions Markedly decreased response to stimuli Marked muscular incoordination; inability to stand or walk Vomiting; incontinence of urine and feces Impaired consciousness; sleep or stupor
0.35-0.50	Coma	Complete unconsciousness; coma; anesthesia Depressed or abolished reflexes Subnormal temperature Impairment of circulation and respiration Possible death
0.45+	Death	Death from respiratory arrest

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Tolerance

With practice, the brain can learn to function better under the influence of ethanol. People vary, therefore, in their abilities to handle ethanol, not just as a result of inherent differences, but as a result of experience.

Tolerance is defined as the ability of an organism to adapt. There are two forms of ethanol tolerance, including:

(1) Psychological: Increased ability to alter behavior in order to not appear intoxicated.

(2) Biochemical: Increased rate of degradation of alcohol to inactive metabolites.

Ethanol Involvement in Auto Crashes

% BAC	Enhancement Factor
0.01-0.04	0.9x
0.05-0.09	1.5x
0.10-0.14	5x
0.15-0.19	14x
0.20-0.24	24x

Borkenstein, et al. 1964

Latest reanalysis of Borkenstein and other data reveals:

at .08 %	Chances are 4x
at .15 %	Chances are 25x
at .20 %	Chances are >100x

Breath Ethanol Determination

As the blood passes through the lungs, ethanol will leave and become part of the expired breath.

Ethanol's distribution between blood and breath obeys Henry's Law.

Henry's Law -- in a closed container, at a given temperature and pressure, a material in solution will be in equilibrium with the air in the space above.

Body temp = 37° C (98.6° F)

Breath temp = 34° C (93.2° F)

The ratio between the concentration of ethanol in the blood and that in the breath from the deepest part of the lung (alveolar air) is called the partition coefficient. The accepted ratio is 2100:1 in the United States.

This ratio means that 2100 mL (2.1 Liters) of alveolar air will contain the same amount of ethanol as does 1 mL of blood.

The amount of ethanol in deep (alveolar) lung air is directly related to the amount present in the blood.

Most of the population has a blood:breath ratio greater than 2100:1

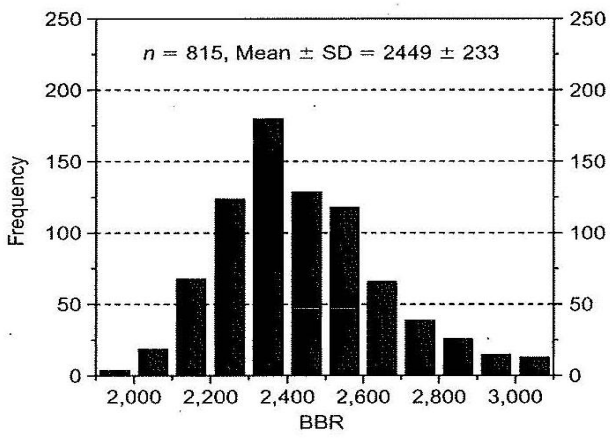
- Breath test instruments in Indiana are calibrated at a ratio of 2100:1
  - For most of the population, Indiana breath test instruments underestimate the BAC
  - A breath test should not produce a higher result than a blood test

Relationship Between
Blood and Breath
Alcohol Concentrations
BAC = BrAC (2,100)

Table 5.1: Blood to breath ratios of alcohol when samples were taken within 10 minutes of each other. Data taken from the Paton Report using an Intoximeter 3000 breath-alcohol analyzer (Cobb and Dabbs, 1985)

Apparent BBR	Frequency	Relative frequency	Cumulative frequency
1,900–1,999	4	0.5	0.5
2,000–2,099	19	2.3	2.8
2,100–2,199	68	8.3	11.1
2,200–2,299	124	15.2	26.3
2,300–2,399	180	22.1	48.4
2,400–2,499	129	15.6	64.2
2,500–2,599	118	14.5	78.7
2,600–2,699	66	8.1	86.8
2,700–2,799	39	4.8	91.6
2,800–2,899	26	3.2	94.8
2,900–2,999	15	1.8	96.6
3,000–3,099	13	1.6	98.2
> 3,100	14	1.8	100

Figure 5.1: Frequency distribution of BBRs of alcohol in drivers apprehended in the UK (data from the Paton Report) where blood and breath were sampled not more than 10 minutes apart (Cobb and Dabbs, 1985)



No corrections were made for the elimination of alcohol over this 10 minute time interval. This graph verifies that very few individuals have BBR less than 2,000:1 (0.5%), although 26% were below 2,300:1. The mean ratio ± standard deviation was 2,449 ± 233 for *n* = 815 apprehended drivers.

Factors Affecting Partition Ratio

Temperature: An increase of 1.8 °F amounts to a 7% increase in the result

Example: An individual with a body temperature of 100.4 °F and an actual BAC of 0.0935% will have a BrAC result of 0.10%

Atmospheric Pressure: No evidence to support variations in partition ratio

Cellular Composition: 2,100 value based on hematocrit (cell volume) of 47%; hematocrit varies between 42 and 52% for males and 37 and 47% for females. A person with a lower hematocrit can have a falsely elevated BAC based on BrBAC—the variability is small and ranges from -2 to +5%

Physical Activity: Exercise can underestimate the BAC based on the BrAC

Breath to blood ratio = the ethanol in 2100 mL (2.1 L) of air is equivalent to the ethanol in 1 mL of blood.

Therefore, in 100 mL of blood there is 210 L of air.

Ethanol reporting units:

Blood – g/100 mL
Breath – g/210 L

Common Challenges to Breath Test Results

Subject vomited or burped:

The argument may be that a subject who had burped or vomited while a high concentration of alcohol existed in the stomach would exhibit falsely elevated breath ethanol levels. **Observe carefully during the 15-minute waiting period. Record your observations, including "nothing unusual."**

Unable to give a sufficient sample due to pulmonary disorders:

Argument against refusal given for Insufficient Sample or Time Out. Cases in which this would be true are rare.

Subject was not impaired at the time of the incident.

The argument is that the subject had recently consumed an alcoholic beverage and was still absorbing ethanol at the time of the incident. (Rebutting 3-hour presumption. This is usually addressed by a toxicologist.)

Lab Ethanol Measurement

Indiana statutes are based on concentrations in whole blood.

ISDT Lab tests whole blood.

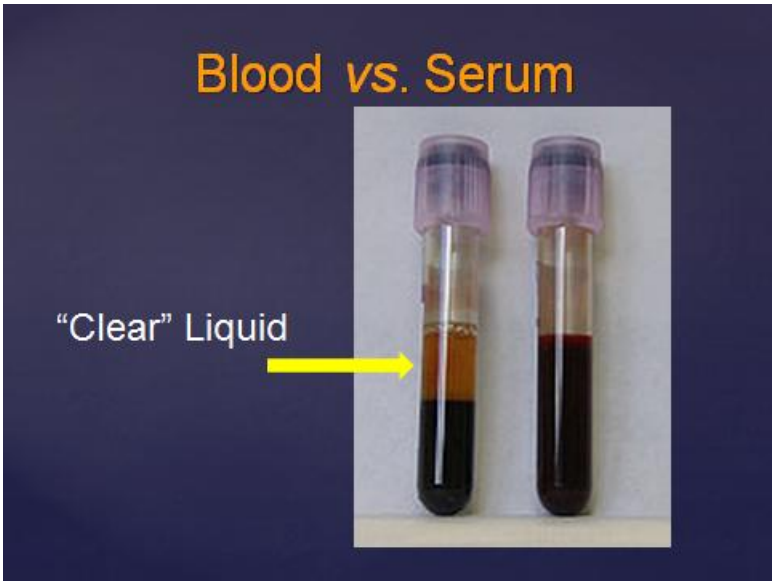
Most hospital labs test serum or plasma, with some exceptions.

Other types of samples can be tested, but have no evidentiary value in Indiana.

Ratio of ethanol in other fluid to that in whole blood:

serum/plasma	1: 1.04- 1.26
saliva	1: 1.10
urine	variable

<u>Blood (impairment) vs. urine (use)</u>



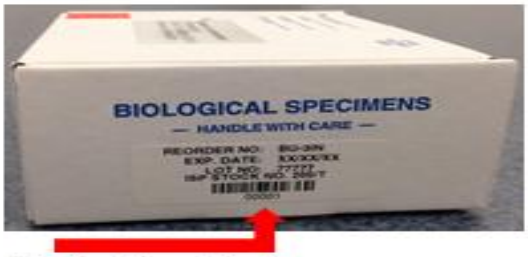
EVIDENCE KITS

- All supplies included
  - Blood Tubes
    - *Urine Bottle*
  - Requisition
  - COC
  - Labels
  - Enclosures
  - Directions
- Pick-up at ISDT
- Ship by FedEx
- Email: toxkits@isdt.in.gov

Security

- Limited lab access
- Convenient and secured submission of evidence
- Easy pick-up of evidence kits
- Located within secure building and only accessible during normal operating hours

The Kit



Expiration Date

Evidence Documentation

ISDT Case Number: _____

Accessioned By: _____

Accessioning Date: _____

Indiana State Department of Toxicology
Evidence Description Form

ENCLOSURES

PRIMARY Container	Sealed	Initialed
ISDT Issued Kit	Y N	Y N
Evidence Envelope	Y N	Y N
Other	Y N	Y N

(Describe other)

SECONDARY Container	Sealed	Initialed
Plastic Bag Over Styro/Card	Y N	Y N
Plastic Bag Over Styro/Card & Urine Container	Y N	Y N
Other	Y N	Y N

(Describe other)

SPECIMENS

Vial	Color	Size (mL)	Type	Approx Vol (mL)	Exp.	Name	Date	Time	Init (col)	Init (off)	OTHER
____	G R L On Go C Other	10 4 Other	WB SP	____	____	Y N	Y N	Y N	Y N	Y N	____
____	G R L On Go C Other	10 4 Other	WB SP	____	____	Y N	Y N	Y N	Y N	Y N	____
____	G R L On Go C Other	10 4 Other	WB SP	____	____	Y N	Y N	Y N	Y N	Y N	____
____	G R L On Go C Other	10 4 Other	WB SP	____	____	Y N	Y N	Y N	Y N	Y N	____
____ (urine)	Empty Not Included			____		Y N	Y N	Y N	Y N	Y N	____

☐ See Secondary Enclosure — Sealed: Y N
☐ Plastic Bag Over Container — Initialed: Y N
☐ Other

Additional Information:

G = Gray, Gn = Green, R = Red, Go = Gold, L = Lavender, C = Clear, Init (col) = Collector's Initials, Init (off) = Officer's Initials, NV = Not Visible, WB = Whole Blood, SP = Serum/Plasma

Page 1 of 1

ISDTF-EvD
Rev. 1, Effective 07/17/13

Blood Specimen Preservation

Sodium Fluoride = Preservative

Potassium Oxalate = Anticoagulant

Temperature --- Refrigeration for extended storage

ISDT Testing Policy

All positive screening results will be confirmed

No need to request confirmation testing

All testing requested will be performed

Exception: Urine ethanol and drug analysis

Value of urine testing at prosecutor's request

Exceptions – Outsourced to NMS

Sexual assault

Child endangerment

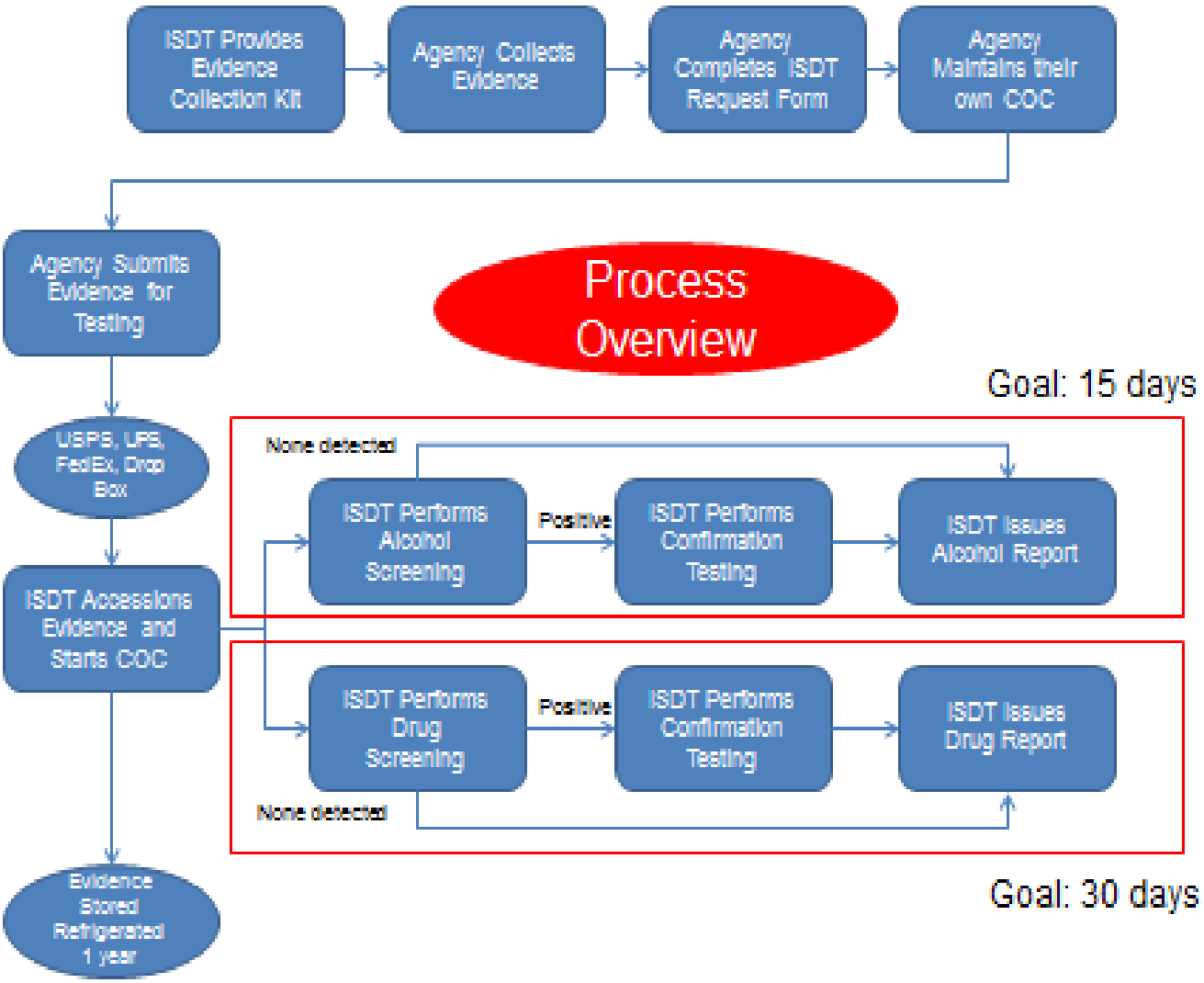
Violent Crime/Homicide

Juvenile

Target turnaround time for alcohol – 15 days

Target turnaround time for drug testing – 30 days

iResults-web-based results


ISDT Provides Evidence Collection Kit
Agency Collects Evidence
Agency Completes ISDT Request Form
Agency Maintains their own COC
Agency Submits Evidence for Testing
Process Overview
Goal: 15 days
USPS, UPS, FedEx, Drop Box
None detected
ISDT Performs Alcohol Screening
Positive
ISDT Performs Confirmation Testing
ISDT Issues Alcohol Report
ISDT Accessions Evidence and Starts COC
ISDT Performs Drug Screening
Positive
ISDT Performs Confirmation Testing
ISDT Issues Drug Report
None detected
Goal: 30 days
Evidence Stored Refrigerated 1 year

Toxicology Testing Request Form

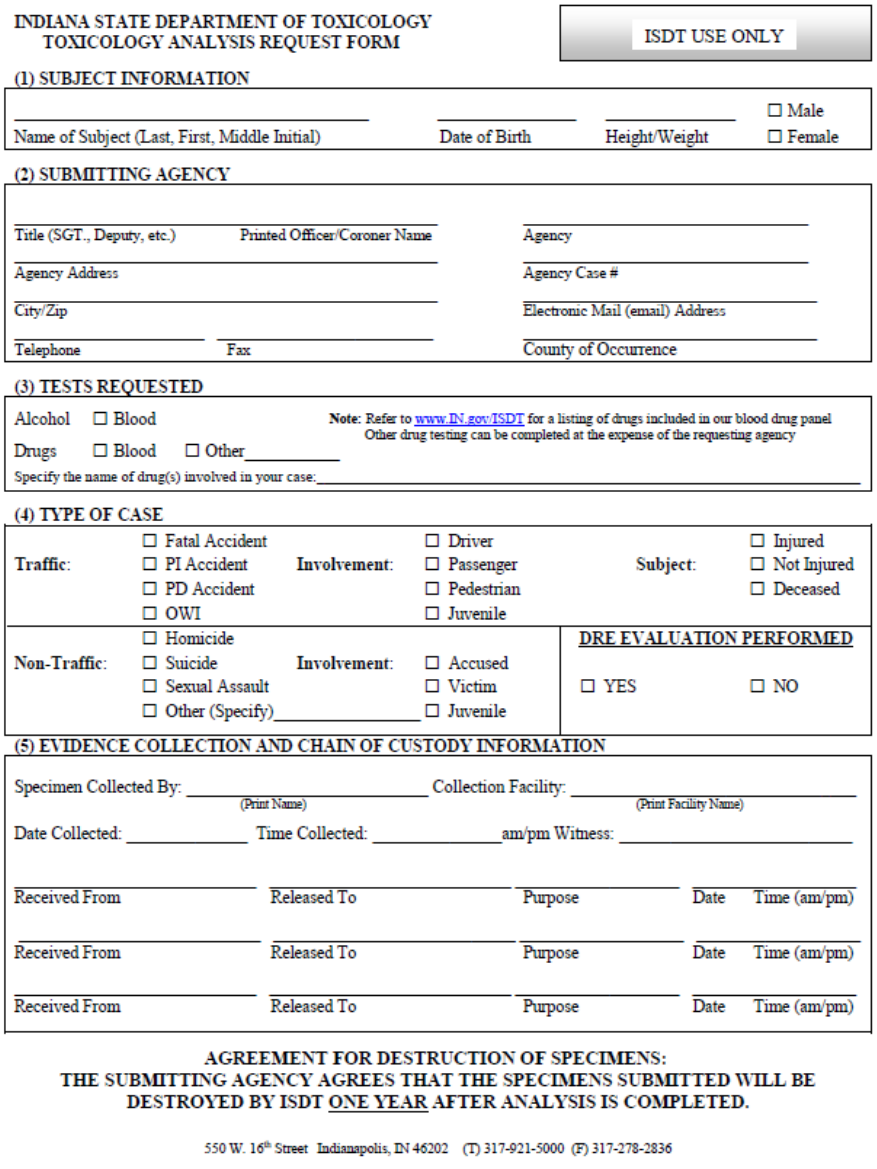
Simplified Single Page Format

No panel choices

No need to request confirmation testing

Information collected primarily for statistical purposes and prioritization

Chain of Custody Information



INDIANA STATE DEPARTMENT OF TOXICOLOGY
TOXICOLOGY ANALYSIS REQUEST FORM

ISDT USE ONLY

(1) SUBJECT INFORMATION

Name of Subject (Last, First, Middle Initial) | Date of Birth | Height/Weight | ☐ Male ☐ Female

(2) SUBMITTING AGENCY

Title (SGT., Deputy, etc.) | Printed Officer/Coroner Name | Agency
Agency Address | Agency Case #
City/Zip | Electronic Mail (email) Address
Telephone | Fax | County of Occurrence

(3) TESTS REQUESTED

Alcohol ☐ Blood
Drugs ☐ Blood ☐ Other_____
Specify the name of drug(s) involved in your case:_____

Note: Refer to www.IN.gov/ISDT for a listing of drugs included in our blood drug panel
Other drug testing can be completed at the expense of the requesting agency

(4) TYPE OF CASE

Traffic:	☐ Fatal Accident ☐ PI Accident ☐ PD Accident ☐ OWI	**Involvement:**	☐ Driver ☐ Passenger ☐ Pedestrian ☐ Juvenile	**Subject:**	☐ Injured ☐ Not Injured ☐ Deceased
Non-Traffic:	☐ Homicide ☐ Suicide ☐ Sexual Assault ☐ Other (Specify)_____	**Involvement:**	☐ Accused ☐ Victim ☐ Juvenile	**DRE EVALUATION PERFORMED**	☐ YES ☐ NO

(5) EVIDENCE COLLECTION AND CHAIN OF CUSTODY INFORMATION

Specimen Collected By: _____ (Print Name) Collection Facility: _____ (Print Facility Name)
Date Collected: _____ Time Collected: _____ am/pm Witness: _____

Received From	Released To	Purpose	Date	Time (am/pm)

AGREEMENT FOR DESTRUCTION OF SPECIMENS:
THE SUBMITTING AGENCY AGREES THAT THE SPECIMENS SUBMITTED WILL BE DESTROYED BY ISDT ONE YEAR AFTER ANALYSIS IS COMPLETED.

550 W. 16th Street Indianapolis, IN 46202 (T) 317-921-5000 (F) 317-278-2836

Reliable Results

Screening Test – aliquot from original specimen

1 day for specimen preparation and analysis

1 day for analyst to process and review results

1 day for peer technical review of results

Confirmation Test – 2 different aliquots from original specimen

1 day for specimen preparation and analysis

1 day for analyst to process and review results

1 day for peer technical review of results

1 day to prepare report

1 day for peer administrative review

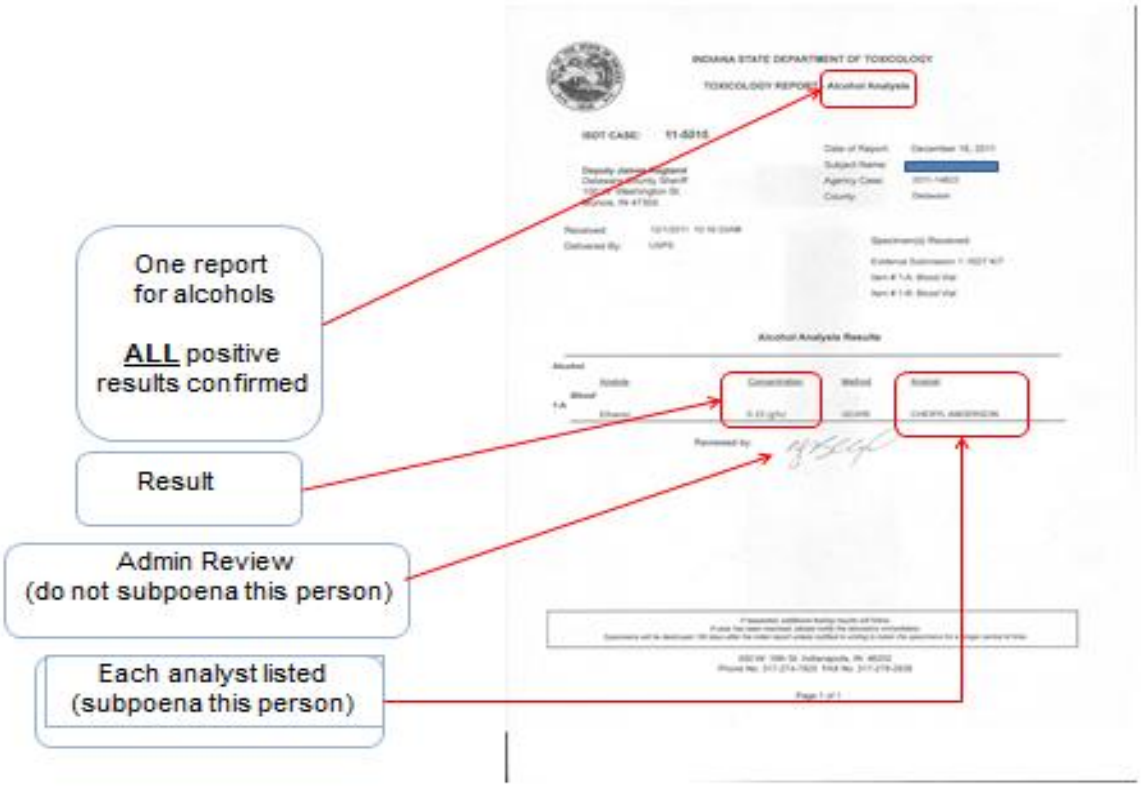
All 3 results must agree within 10%

QC samples run in the beginning, end, and after every 10-12 evidentiary samples

Calibration run for each batch

Proficiency samples tested (College of American Pathologists – CAP)

None Detected
alcohol result



None Detected Drug Report

One report for drugs

ALL positive results confirmed

If an NMS report is included it will be noted at the bottom of the report

INDIANA STATE DEPARTMENT OF TOXICOLOGY

TOXICOLOGY REPORT - Drug Analysis

SENT

ISDT CASE: 11-4343

Drug Analysis Results

2nd Page of Drug Report

INDIANA STATE DEPARTMENT OF TOXICOLOGY

TOXICOLOGY REPORT - Drug Analysis

SENT

DRUGS INCLUDED IN TESTING:

ISDT Specimen Chain of Custody

ISDT CASE CHAIN OF CUSTODY REPORT

ISDT Case #:

ITEM # / DESCRIPTION: 1 Biohazard Bag
OTHER ID #:

Date/Time of Transfer	From	PSN	To	PSN	Purpose
9/26/2011 5:14:30PM	DROP BOX,	[ ]	Meyers, Erica	[X]	Receiving
9/26/2011 5:15:33PM	Meyers, Erica	[X]	Walk-In	[ ]	Storage
10/3/2011 11:11:59AM	Walk-In	[ ]	Collantes, Grace	[X]	Accessioning
10/3/2011 12:57:03PM	Collantes, Grace	[X]	Trash	[ ]	Trash

ITEM # / DESCRIPTION: 1-A Blood Tube
OTHER ID #:

Date/Time of Transfer	From	PSN	To	PSN	Purpose
9/26/2011 5:14:30PM	DROP BOX,	[ ]	Meyers, Erica	[X]	Receiving
9/26/2011 5:15:33PM	Meyers, Erica	[X]	Walk-In	[ ]	Storage
10/3/2011 11:11:59AM	Walk-In	[ ]	Collantes, Grace	[X]	Accessioning
10/3/2011 12:52:11PM	Collantes, Grace	[X]	Walk-In	[ ]	Storage
10/5/2011 8:25:03AM	Walk-In	[ ]	Keller, Karina	[X]	Transfer
10/5/2011 8:25:05AM	Keller, Karina	[X]	Sample Prep Area	[ ]	ELISA BOX
10/5/2011 11:23:50AM	Sample Prep Area	[ ]	Keller, Karina	[X]	Transfer
10/5/2011 11:23:52AM	Keller, Karina	[X]	Walk-In	[ ]	Storage
10/24/2011 10:48:58AM	Walk-In	[ ]	Meyers, Erica	[X]	Prep sample & transfer to
10/24/2011 10:49:00AM	Meyers, Erica	[X]	FEDEX,	[ ]	Transfer

ITEM # / DESCRIPTION: 1-B Blood Tube
OTHER ID #:

Date/Time of Transfer	From	PSN	To	PSN	Purpose
9/26/2011 5:14:30PM	DROP BOX,	[ ]	Meyers, Erica	[X]	Receiving
9/26/2011 5:15:33PM	Meyers, Erica	[X]	Walk-In	[ ]	Storage
10/3/2011 11:11:59AM	Walk-In	[ ]	Collantes, Grace	[X]	Accessioning
10/3/2011 12:52:11PM	Collantes, Grace	[X]	Walk-In	[ ]	Storage
10/24/2011 10:57:33AM	Walk-In	[ ]	Meyers, Erica	[X]	Prep sample & transfer to
10/24/2011 10:57:37AM	Meyers, Erica	[X]	FEDEX,	[ ]	Transfer

NOTE: [X] indicates a secured transaction (a PSN was entered)

11/14/2011 Page 1 of 1

Indiana State Department of Toxicology Testing Summary

Drug	Trade/Alternate Name	Screening Cutoff Blood	Screening Cutoff Urine	Screening Technique	Confirmation Cutoff Blood	Confirmation Cutoff Urine	Confirmation Technique
Amphetamines		20 ng/mL	300 ng/mL	ELISA	10 ng/mL	50 ng/mL	GC/MS
Amphetamine	Adderall						
MDMA (Ecstasy)	Ecstasy						
Methamphetamine	Methamphetamine						
Pseudoephedrine	Sudafed						
Barbiturates		500 ng/mL	1000 ng/mL	ELISA	500 ng/mL	500 ng/mL	GC/MS
Amobarbital	Amobarbital						
Butabarbital	Butabarbital						
Butalbital	Fioricet, Fiorinal						
Pentobarbital	Nembutal						
Phenobarbital	Luminal						
Secobarbital	Secobarbital						
Benzodiazepines		50 ng/mL	100 ng/mL	ELISA	10 ng/mL	50 ng/mL	LC/MS/MS
α-hydroxyalprazolam	Alprazolam metabolite						
7-aminoclonazepam	Clonazepam metabolite						
Alprazolam	Xanax						
Clonazepam	Klonopin						
Desalkylflurazepam	Flurazepam metabolite						
Lorazepam	Ativan						
Midazolam	Versed						
Diazepam	Valium				50 ng/mL		
Nordiazepam	Diazepam metabolite						
Oxazepam	Serax						
Temazepam	Restoril						
Cannabinoids		10 ng/mL	20 ng/mL	ELISA	2 ng/mL THC 5 ng/mL THC-COOH	10 ng/mL	GC/MS
THC	Marijuana						
THC-COOH	Marijuana metabolite						
Carisoprodol/Meprobamate		500 ng/mL	500 ng/mL	ELISA	2000 ng/mL	2000 ng/mL	GC/MS
Carisoprodol	Soma						
Meprobamate	Carisoprodol metabolite						
Cocaine		50 ng/mL	300 ng/mL	ELISA	10 ng/mL	50 ng/mL	GC/MS
Cocaine	Cocaine						
Benzoylecgonine	Cocaine metabolite						
Fentanyl		1.0 ng/mL	1.0 ng/mL	ELISA	1.0 ng/mL	1.0 ng/mL	LC/MS/MS
Fentanyl	Duragesic						
Norfentanyl	Fentanyl metabolite						
Methadone	Methadone	50 ng/mL	300 ng/mL	ELISA	10 ng/mL	50 ng/mL	GC/MS
Opiates		20 ng/mL	200 ng/mL	ELISA	10 ng/mL	N/A	GC/MS
Codeine	Tylenol #3						
Hydrocodone	Vicodin, Lortab						
Hydromorphone	Dilaudid						
Morphine	MS Contin						
6-MAM	Heroin metabolite						
Oxycodone	Percocet, Oxycontin						
Oxymorphone	Opana						
Zolpidem	Ambien	10 ng/mL	50 ng/mL	ELISA	10 ng/mL	50 ng/mL	GC/MS
Alcohols		0.01 g%	0.01 g%	HS-GC	0.01 g%	0.01 g%	HS-GC *The lower of the two confirmations will be used to report.
Acetone	Acetone						
Ethanol	Beer, Wine, Spirits						
Isopropanol	Rubbing Alcohol						
Methanol	Wood Alcohol						

ELISA = Enzyme-Linked Immuno-sorbent Assay
GC/MS = Gas Chromatography / Mass Spectrometry
HS-GC = Headspace – Gas Chromatography
LC/MS/MS = Liquid Chromatography tandem Mass Spectrometry
Cutoff = Lowest concentration of drug that can be reported
Trade / Alternate Name = Not meant to be comprehensive / inclusive; only meant to provide an example of alternate drug name

SPECIMEN GUIDANCE:

Blood: 10 mL minimum collected into vacutainer tube containing anticoagulant (heparin or EDTA) and preservative (NaF). (Gray top preferred)

Urine: 10 mL minimum collected into sterile plastic container

Other: consult ISDT Toxicologist

NOTE: All positive screening results will be confirmed and quantified.

Testing Aspects of Drugs for OVWI

- Type of sample
- Timing of sample
- Testing of sample
- Interpretation of results

Types of Samples

- Blood
  - Can show impairment
  - Requires person trained to draw blood
  - Shorter detection time window
- Urine
  - Can show use, but not impairment
  - Can be taken by anyone
  - Most drugs detected over a longer time

Timing of Sample

- For most drugs
  - Detectable in blood for 4 to 5 half-lives
  - Present in urine 2-30 days – depending on drug
- Some exceptions
  - Inhalants
    - Not in urine at all
    - Present in blood for about an hour after use
  - Cannabinoids (Marijuana)
    - In urine for up to approximately 30 days (depends on prior use)

Testing of Sample

- Screen test
  - Shows presence/absence of drug class
  - Needs confirmation for use in court
- Confirmation test
  - Separate test for each class
  - Shows concentrations of individual drugs
  - Needs interpretation

Interpretation: Confirmation Results

- Substances found
  - Active drugs/metabolites
  - Inactive metabolites
- Concentrations
  - Can show possible level of impairment (Blood)
  - Can show approximate time of use (Blood and Urine)
  - Can determine approximate dosage (Blood)

CNS Depressants

- Alcohol (ethanol, methanol, isopropanol)
- Benzodiazepines – 12+, including
  - Valium (Diazepam)
  - Halcion (Triazolam)
  - Xanax (Alprazolam)
- Barbiturates – 5, including
  - Amytal (amobarbital)
  - Nembutal (pentobarbital)

Cannabinoids

- Delta-9 THC (tetrahydrocannabinol or THC)
  - Active drug
  - Detectable in blood for ~6 hrs after use
  - Stored in fat within the body
- Delta-9 Carboxy THC (THC-COOH)
  - Inactive metabolite
  - Detectable in blood for ~24 hours after acute use
  - Detectable in urine for many days

Narcotic Analgesics (Opiates)

- Codeine
- Morphine
- Hydrocodone (Hycodan, Lortab)
- Hydromorphone (Dilaudid)
- Oxycodone (Oxycontin, Percocet)
- Oxymorphone (Numorphan)
- Methadone (Dolophine)
- Fentanyl

CNS Stimulants

- Cocaine and metabolite
  - Cocaine
  - Benzoylecgonine (inactive)
- Amphetamines
  - Methamphetamine
  - MDMA (Ecstacy, XTC)
  - Amphetamine
  - Pseudoephedrine

Other Drugs

Carisoprodol (Soma)

Zolpidem

Legal Aspects of Breath Testing for Ethanol

Reasonable Suspicion

Definition of Reasonable Suspicion

When is reasonable suspicion needed?

Recent Indiana cases:

Robinson v. State, 5 N.E.3d 362 (Ind. 2014)

State V. Keck, 4 N.E.3d 1180 (Ind. 2014)

Bowers v. State, 980 N.E.2d 911 (Ind. App. 2011)

Anticipate defense challenges when stopping a suspected impaired driver.

Phoned-in traffic complaints/tips from reliable observer

When can officer rely on tip?

When must behavior be observed by officer?

Recent Indiana case: Hassfurther v. State, 988 N.E.2d 811 (Ind. App. 2013)

Length of detention must be reasonable

Stop for minor traffic violation

Recent Indiana case: Lucas v. State, 15 N.E.3d 96 (Ind. App. 2014)

Implied Consent

A person who operates a vehicle impliedly consents to submit to a chemical test as a condition of operating a vehicle in Indiana.

Chemical test means an analysis of a person's blood, breath, urine, or other bodily substance for the determination of the presence of alcohol, a controlled substance or its metabolite, or a drug or its metabolite.

Implied Consent Advisement

If the person refuses to submit to a chemical test, you **shall** inform the person that refusal will result in the suspension of the person's driving privileges.

Recent Indiana case: State v. Schulze (Ind. App. August 2014)

Miranda Warning

Miranda warning must be given when suspect is in custody AND is being interrogated.

Many times, Miranda warning is given after the suspect fails the breath test.

Once subject is in custody, officer should not question subject about vehicle operation, impairment, crash details, etc., until *Miranda* warning is given.

In custody

Gray area – Not clearly delineated

Handcuffing suspect is placing "in custody."

Putting suspect in police car may constitute "in custody."

Traffic stop and asking subject to get out of car, in and of itself, is not "in custody."

Interrogation

Neither Portable Breath Tests (PBT) nor Field Sobriety Tests (FST) are statements. They alone, therefore, do not constitute an interrogation.

Accordingly, if you do a PBT or a FST without interrogating suspect, you are not required to give the *Mira nda* warning.

Similarly, breath and blood samples do not require *Miranda* warning.

Your Testimony

Preparation for testimony **begins at the time of the incident**

Recognize and document significant evidence

Compile complete and accurate notes and reports

Preparation for testimony **continues prior to trial**

Review case file

Discuss case with other officers who witnessed or assisted

Mentally organize elements of offense and supporting evidence

Revisit the scene if appropriate

Discuss case with assigned prosecutor

During Testimony

Provide specific descriptive details

Avoid vague language

Testimony regarding the breath test

Describe administering the Approved Method

1. Observation time (use same timepiece throughout)
2. Instructions given
3. Subject cooperation or lack of cooperation
4. How results are expressed

Testimony about training

Dates of your certification

Verify dates of certification with your identification card covering the period in question.

Keep current identification card with you and save all old/expired cards.

Topics taught in Training Course for Breath Test Operator Certification

This course has covered the areas required by 260 IAC 2-2-2:

(1) The pharmacology and toxicology of ethanol

(2) The legal aspects of breath testing for ethanol

(3) The theory, operation, and care of breath test equipment

(4) The use of a breath test instrument using known ethanol-water or ethanol-gas standards

Questions officers lack expertise to answer in testimony

Certification process

How instruments are certified

When instrument was last certified

Any questions regarding instrument certification materials or process

Expert testimony regarding pharmacology/toxicology of ethanol

Effect of ethanol

How much ethanol results in impairment

Mechanics of instrument operation and maintenance

How the instrument operates

How/when maintenance is done

Any other questions relating to repair and/or maintenance of instrument

"I don't know."

Do not volunteer more information than necessary to answer questions asked.

Focus on answering questions succinctly

Other Issues/Relevant Statutes

IC 9-30-5 and prima facie evidence of intoxication

1. 0.08 g. of ethanol per 100 ml. of blood or 210 liters of breath
2. 0.15 g. of ethanol per 100 ml. of blood or 210 liters of breath

IC 9-30-7 – implied consent for accident involving serious injury or death

"A law enforcement officer shall offer a portable breath test or chemical test to any person who the officer has reason to believe operated a vehicle that was involved in a fatal accident or an accident involving serious bodily injury." (IC 9-30-7-3)

Blood search warrants

Metzger v. State, 6 N.E.3d 485 (Ind. App. 2014)

Missouri v. McNeely (2013 U.S. Supreme Court decision)

IC 34-47-3-1 Disobedience of process or order

IC 9-30-6-6(a) Subpoenas for hospital blood samples/test results:

If medical personnel take a sample during the course of normal treatment, the sample or test results shall be provided to an officer who requests them as part of a criminal investigation **even if the patient does not consent**.

Instrumentation and Approved Method for Breath Analysis

Intox EC/IR II

NHTSA-approved as an evidentiary breath alcohol instrument

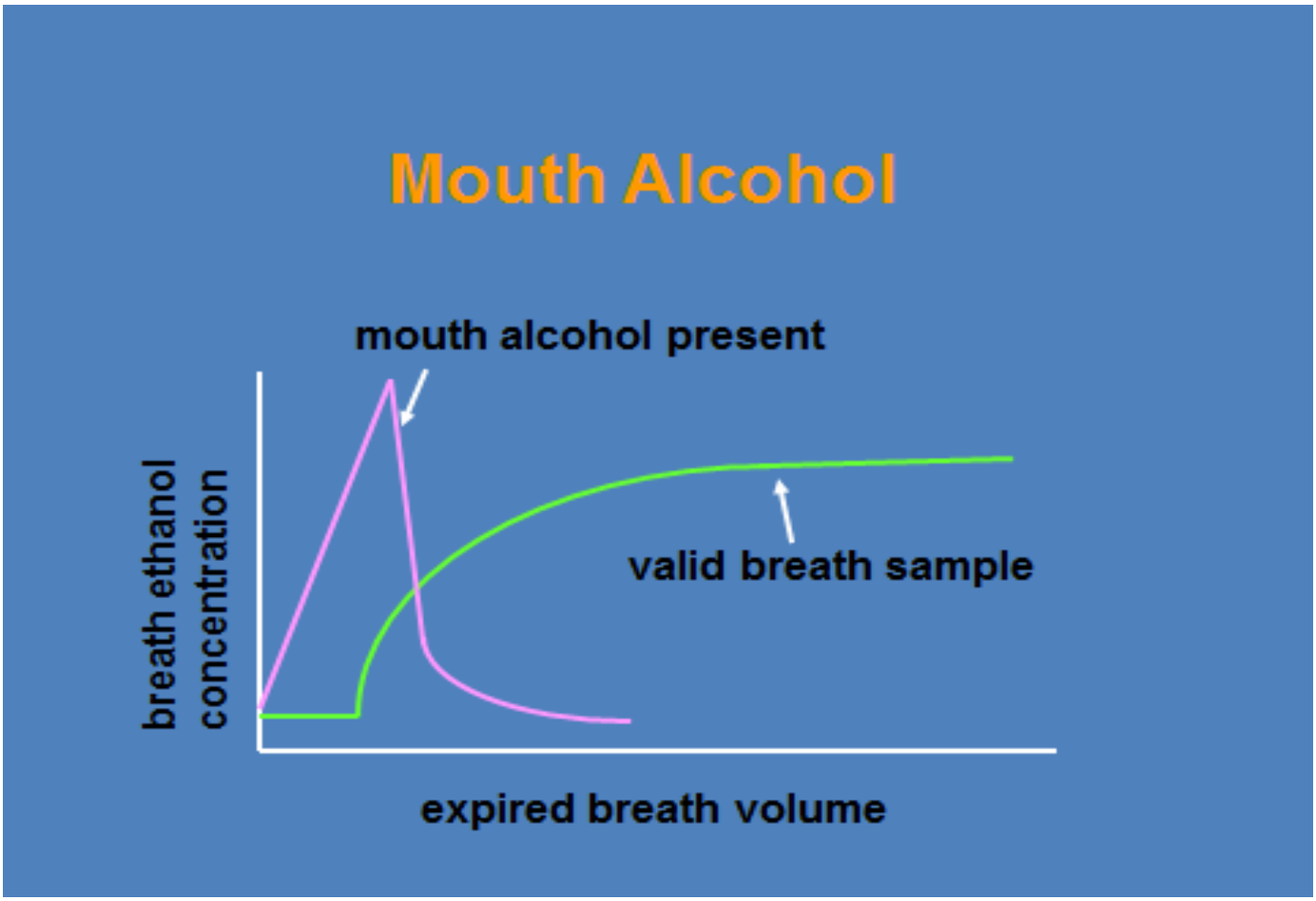
Theory of Operation

- EC = Electrochemical (fuel cell)
- IR = Infrared

  - Intox EC/IR II uses fuel cell technology to measure amount of ethanol in a sample
  - Intox EC/IR II uses infrared technology to detect mouth alcohol

The infrared system tracks the ethanol concentration in the sample in near real time to detect the presence of mouth alcohol, but does not produce a BAC measurement

  - If mouth alcohol is present, the IR system will detect that there is a higher ethanol concentration in the subject's mouth air than in the subject's deep lung air



Intox EC/IR II

When a breath sample containing ethanol is introduced into the fuel cell sample port, an electrochemical reaction occurs.

Measurement of the electrical current produced indicates the amount of ethanol consumed by the fuel cell.

The fuel cell is specific to alcohol, but not specific to ethanol.

- Intox EC/IR II detects methanol and isopropanol (alcohols other than ethanol) as interferents.

Acetone is not a fuel for the fuel cell, so the fuel cell does not react to it.

Accuracy Checks

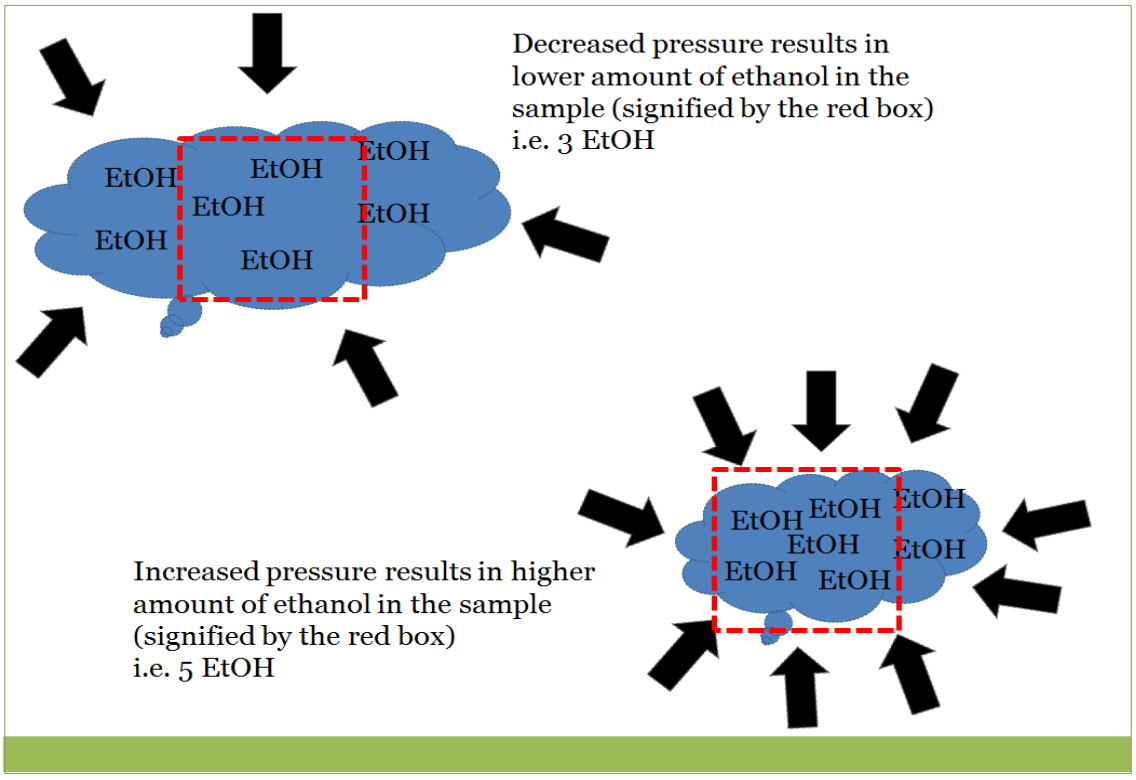
The Intox EC/IR II performs a calibration (accuracy) check before and after each breath test by testing a sample from an internal dry gas tank containing a certified value of ethanol and nitrogen.

Instrument will disable if result of each calibration check is not within 0.005 or 5%, whichever is greater, of the target value*.

*Target value = the certified value of the ethanol and nitrogen standard (dry gas in the instrument's internal tank) adjusted for the ambient barometric pressure

- Ethanol molecules in dry gas are affected by ambient barometric pressure: high pressure keeps the molecules closer together, resulting in a higher ethanol measurement; low pressure allows the molecules to spread, resulting in a lower ethanol measurement

*****The target value is listed on the instrument report as "Dry Gas Target."**



The Intox EC/IR II adjusts for this effect by measuring the ambient barometric pressure to determine a target value for itself when it measures the ethanol in its internal dry gas tank

Care of the Intox EC/IR II

Instrument should be left turned on 24/7

- Any person can turn instrument on or off***

***But this should only be done if absolutely necessary

Only persons authorized by director of ISDT may make changes that affect instrument calibration

Instrument should not be operated in environments heavy with alcohol vapor, cigarette smoke, high levels of radio frequencies, or magnetic interference.

- Intox EC/IR II is designed so that none of these environmental conditions will affect test results
- Prolonged exposure to these conditions may shorten the life of the fuel cell

Instrument displays a status message indicating the condition when:

- it fails a calibration check
- it malfunctions
- the dry gas tank is low

- If this occurs, notify ISDT

Other Intox EC/IR II status messages

Maximum Flow Exceeded

Potential cause: The subject blew with too much force.

Check Ambient Conditions

Potential cause: The breath tube is too close to the subject. The instrument may be detecting alcohol in the ambient air from the subject exhaling alcohol near the breath tube.

Instrument Service

To request service of an instrument, complete and email the service request form on the State Department of Toxicology website or call ISDT at 317-921-5000.

Provide the following information:

Officer's name (or name of contact person at instrument location)

Instrument location

Instrument serial number

Description of any issues and status messages displayed or printed on instrument reports.

An inspector will be notified as soon as possible and will contact the instrument location.

Approved method for Intox EC/IR II

The **approved method** that **shall be followed** in making an analysis of breath for ethanol using the Intox EC/IR II breath test instrument has twelve steps. (260 IAC 2-4-2)

***These are rules, not guidelines.**

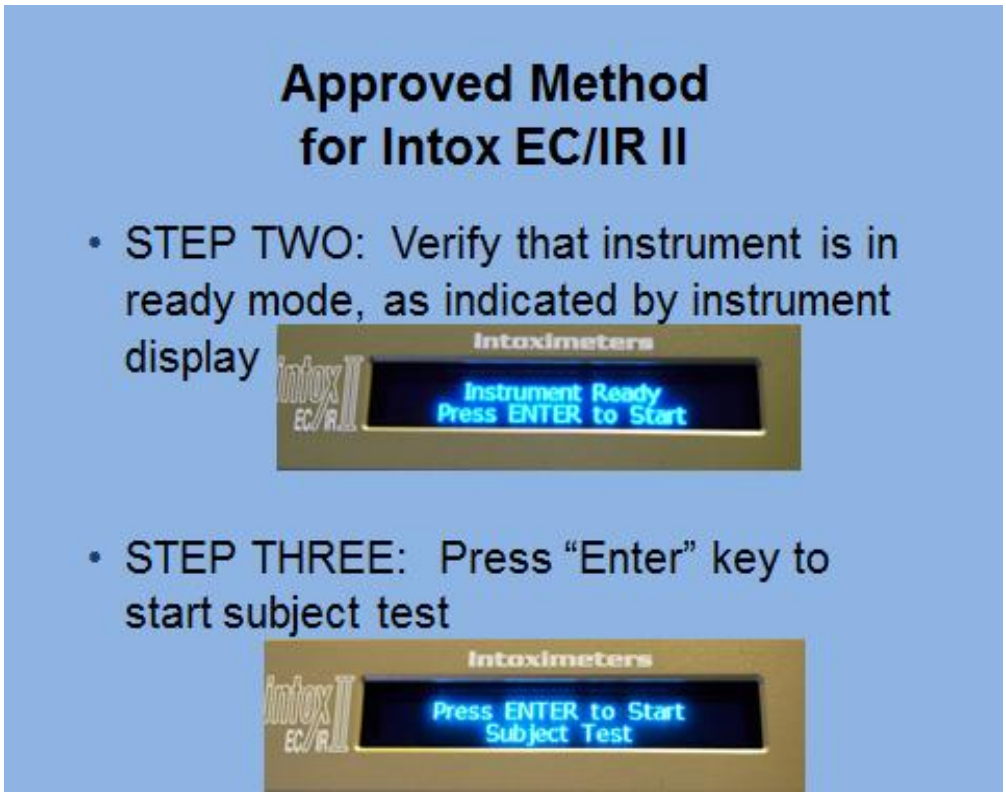
- STEP ONE: Person to be tested must:
  - have had nothing to eat or drink,
  - not have put any foreign substance into mouth or respiratory tract, and
  - not smoke

  within 15 minutes before time first breath sample is taken or at any time from first breath sample until after final breath sample
  - Fifteen-minute period can begin before subject arrives at testing site

    One of the common challenges to breath test results is that the subject burped or vomited prior to the test, causing an elevated breath ethanol level. Observe the subject during the 15-minute waiting period, and record your observations, including "nothing unusual." If the subject burps or vomits during the 15-minute period, begin a new 15-minute period, or take the subject for a blood test.

- STEP TWO: Verify that instrument is in ready mode, as indicated by instrument display
  - Check to see that the printer is online and has paper.

- STEP THREE: Press "Enter" key to start subject test



- STEP FOUR: Insert identification card into barcode reader, or press "Enter" key and use keyboard to enter breath test operator information requested by instrument display

  All of the information scanned from the operator ID card may be edited by using the instrument keyboard. Any text that is highlighted on the instrument display may be edited; e.g., a last name change or a department change.

- STEP FIVE: When requested by instrument display, enter beginning date and time of the 15-minute period

  Format for date is MM/DD/YYYY
  Format for time is HH:MM (military time)

  Instrument will calculate 15 minutes from the beginning time entered by the operator. If the beginning time entered was not ≥ 15 minutes ago, instrument will delay start of test sequence until 15 minutes have elapsed from the beginning time entered. Examples: If beginning time entered was 10 minutes ago, instrument will wait for 5 minutes before starting the test sequence. If beginning time entered was 30 minutes ago, instrument will begin the test sequence.

Approved Method for Intox EC/IR II

- STEP FIVE: When requested by instrument display, enter beginning date and time of the 15-minute period

- STEP SIX: When requested by instrument display, select "Y" or "N" to indicate whether operator is officer with control of subject during the 15-minute period

Approved Method for Intox EC/IR II

- STEP SIX: When requested by instrument display, select "Y" or "N" to indicate whether operator is officer with control of subject during the 15-minute period

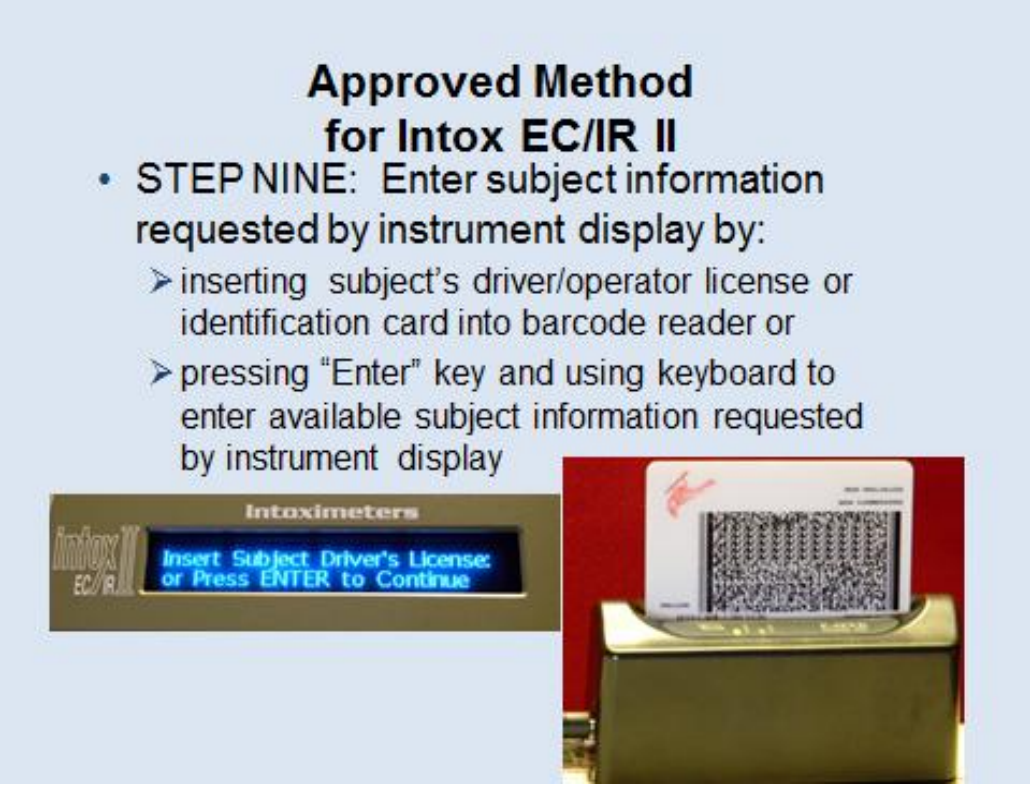
- STEP SEVEN: If "N" is selected in STEP SIX, when requested by instrument display, enter information of officer with control of subject during the 15-minute period

- STEP EIGHT: Enter incident information requested by instrument display

Use spacebar to move between "Reason for Test:" options

- STEP NINE: Enter subject information requested by instrument display by:
  - inserting subject's driver/operator license or identification card into barcode reader or
  - pressing "Enter" key and using keyboard to enter available subject information requested by instrument display

  Scanned DL info cannot be edited by keyboard



- STEP TEN: When "Please blow" appears on instrument display, place new mouthpiece in breath tube. Instruct subject to deliver a breath sample. Remove mouthpiece when prompted by instrument display and discard.

  Do not allow the test subject to handle the breath tube.

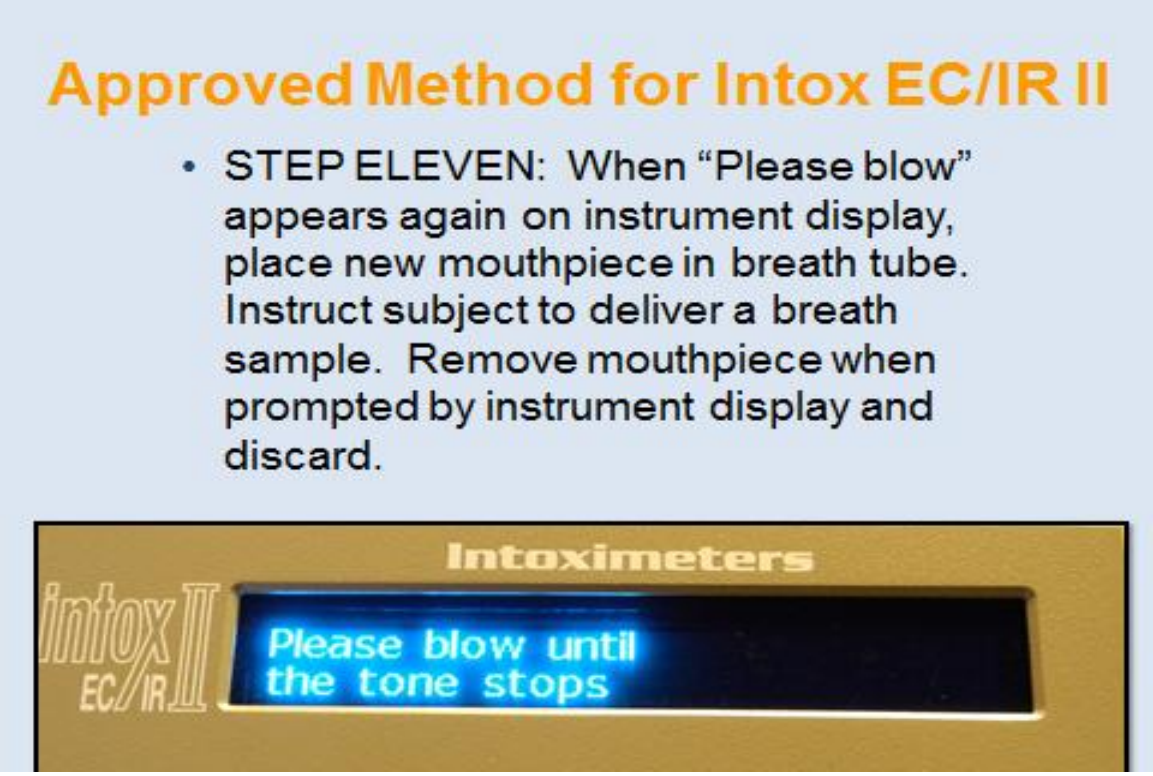
  Instruct the subject: "Take a deep breath and hold it, make a tight seal around the mouthpiece, and then blow long and steady until I tell you to stop."

  If minimum flow is not reached within 3 minutes from time that "Please blow"/"Press 'R' for refusal" is displayed, instrument will display "Refusal? [Y/N]." The 3-minute timer resets after each "Insufficient Sample." If this occurs 3 times, test sequence ends.

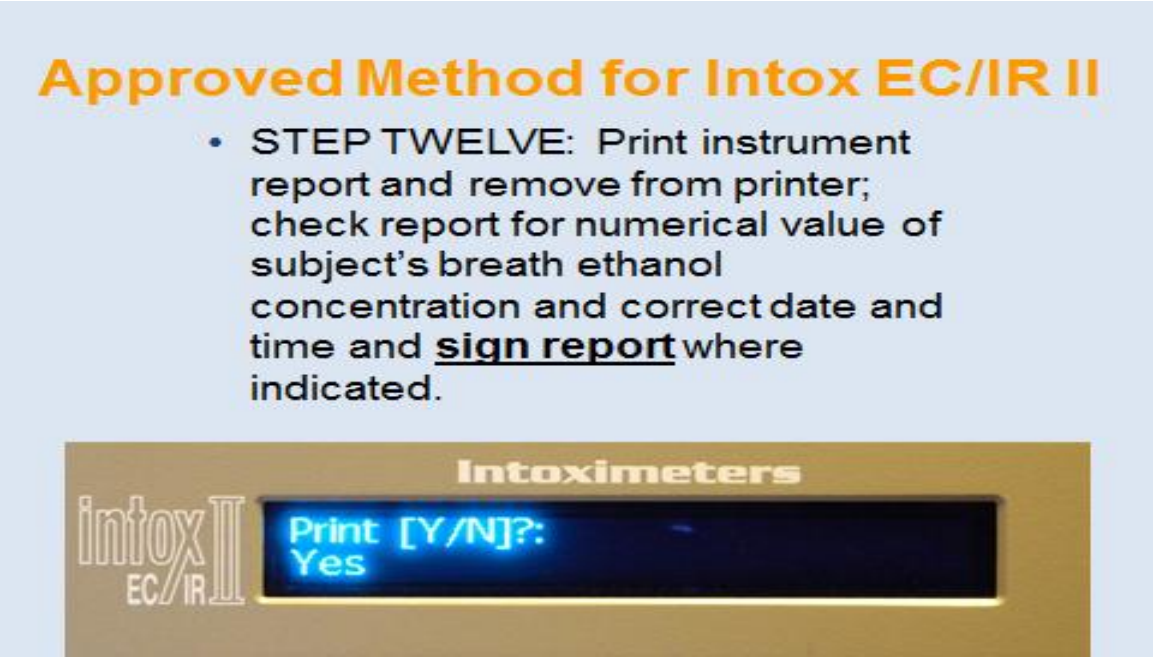
  Removal of Mouthpiece: The approved method requires the removal of the mouthpiece from the breath tube in order to ensure that there will not be a mouthpiece on the breath tube during the instrument's Purge/Blank cycle, which could result in a failed Blank Check. In order to ensure compliance with this requirement, you may remove the mouthpiece after each delivery or each attempted delivery of each breath sample without waiting for the prompt by the instrument display.

- STEP ELEVEN: When "Please blow" appears again on instrument display, place new mouthpiece in breath tube. Instruct subject to deliver a breath sample. Remove mouthpiece when prompted by instrument display and discard.

After delivery of the first sample there is a 2-minute delay before the next "Purging Remove Mouthpiece" prompt.



- STEP TWELVE: Print instrument report and remove from printer; check report for numerical value of subject's breath ethanol concentration and correct date and time and **sign report** where indicated



Two-test sequence with 0.020 agreement

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.*077*
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.120	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	0.118	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
CHK	0.076	11:08	**calibration check**
BLK	0.000	11:09	**blank check**

Test Status Sample Complete

RESULT: 0.118 g/210L 11:06 EDT, 08/07/2013 ← **subject's breath ethanol content (the lower of the two results)**

ALCOHOL READINGS ARE EXPRESSED AS
GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

"System Check" is a set of internal diagnostics that looks at the baselines of all the instrument sensors. Although only the first system check appears on the instrument report, the instrument performs a system check before each function in the test sequence (i.e., before every blank check, every accuracy check, every subject test).

You may use this instrument report.

Approved method for Intox EC/IR II
260 IAC 2-4-2(b)(1):

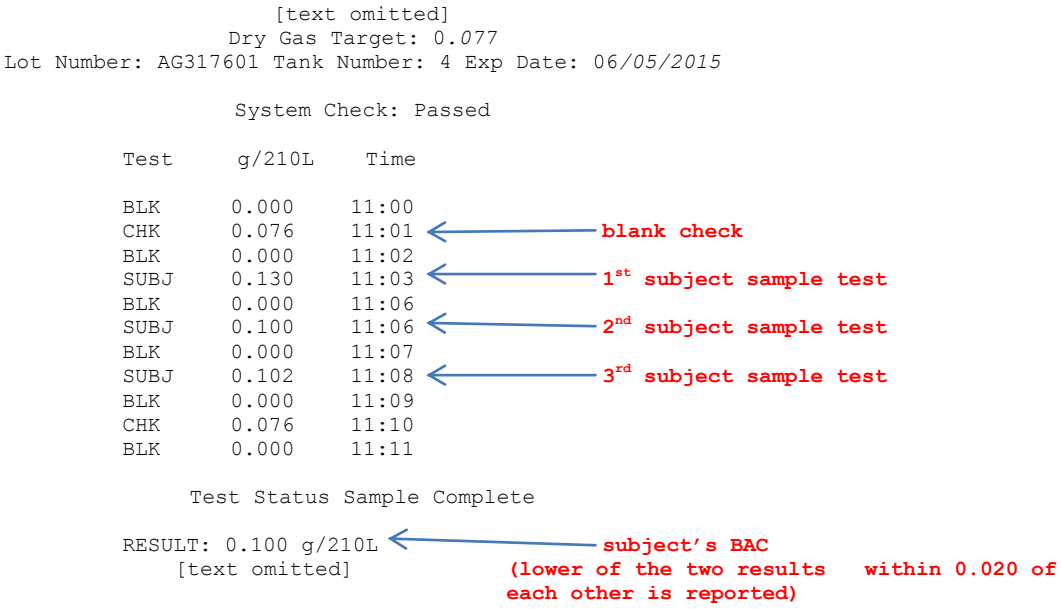
- If "Please blow" appears on instrument display after completion of STEPS ONE through ELEVEN, perform an additional breath test, beginning with STEP ELEVEN

  The instrument prompts for an additional test when the BAC results of the two previous tests in the sequence are not within 0.020 of each other.

- If "No 0.020 Agreement"******* is printed on report after this additional test:
  - perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE;
  - obtain an alternate chemical test for ethanol, or
  - perform a breath test on another instrument

***** Example:** If the first test result is 0.130 and the second result is 0.100, the instrument will prompt for a third sample.

Three-test sequence with 0.020 agreement



The lower of the two results within 0.020 of each other is reported as the subject's BAC.

You may use this instrument report.

Three-test sequence with no 0.020 agreement

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.130	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	0.105	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
SUBJ	0.083	11:08	**3rd subject sample test**
BLK	0.000	11:09	**blank check**
CHK	0.076	11:10	**calibration check**
BLK	0.000	11:11	**blank check**

Test Status **No 0.020 Agreement**

RESULT: *.*** g/210L ← **no BAC reported**
11:08 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

_____

Operator Signature

You may <u>not</u> use this instrument report to determine subject BAC.

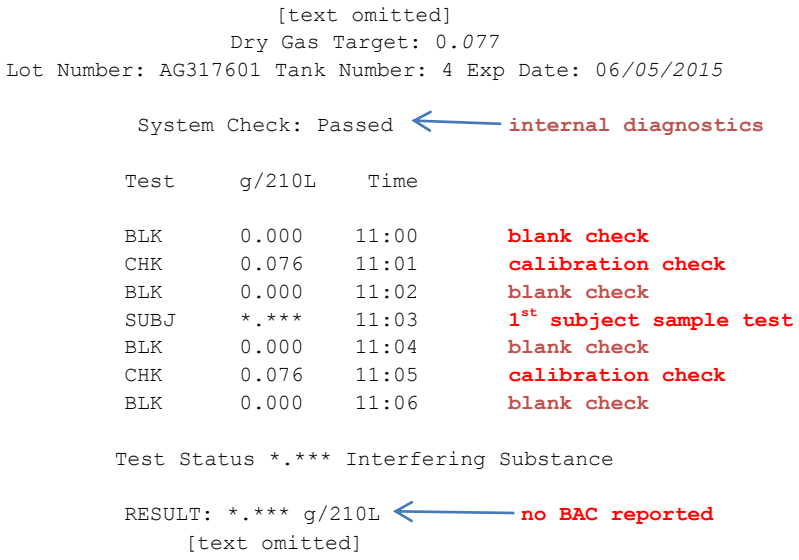
Approved method for Intox EC/IR II
260 IAC 2-4-2(b)(2):

- If "Interfering Substance" is printed on report, perform an additional breath test beginning with STEP ONE and proceeding through STEP TWELVE

  Another 15-minute waiting period <u>is required</u> before beginning an additional breath test.

- If "Interfering Substance" is printed on report after this additional test sequence:
  - obtain an alternate chemical test for ethanol;
  - perform a breath test on another instrument, or
  - if a numerical value for subject's BAC is printed on a report, check for correct date and time and **<u>sign where indicated</u>**

Test sequence with Interfering Substance on first subject sample



If you get an "Interfering Substance" on the first test of a sequence, the sequence will end, and the result will be "Interfering Substance."

You may <u>not</u> use this instrument report.

Test sequence with Interfering Substance on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.*077*
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.120	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	*.***	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
CHK	0.076	11:08	**calibration check**
BLK	0.000	11:09	**blank check**

Test Status *.*** Interfering Substance

RESULT: 0.120 g/210L ← **subject's BAC**
11:03 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may <u>not</u> use this instrument report unless you complete a second breath test as specified in the Approved Method, beginning with a 15-minute waiting period.

Approved method for Intox EC/IR II
260 IAC 2-4-2(b)(3):

- If "RFI Detected" is printed on report, locate and remove source of interference, and perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE

  Another 15-minute waiting period <u>is not required</u>

- If "RFI Detected" is printed on report after this additional test sequence:
  - obtain an alternate chemical test for ethanol;
  - perform a breath test on another instrument, or
  - if a numerical value for subject's BAC is printed on a report, check for correct date and time and **<u>sign where indicated</u>**

***Intox EC/IR II case construction provides "Faraday Cage" immunity

Test sequence with RFI Detected on first subject sample

[text omitted]
Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

System Check: Passed ← internal diagnostics

Test	g/210L	Time	
BLK	0.000	11:00	blank check
CHK	0.076	11:01	calibration check
BLK	0.000	11:02	blank check
SUBJ	*.***	11:03	1st subject sample test
BLK	0.000	11:04	blank check
CHK	0.076	11:05	calibration check
BLK	0.000	11:06	blank check

Test Status *.*** RFI Detected

RESULT: *.*** g/210L ← no BAC reported
[text omitted]

If you get an "RFI Detected" on the first test of a sequence, the sequence will end, and the result will be "RFI Detected."

You may <u>not</u> use this instrument report.

Test sequence with RFI Detected on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.*077*
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.120	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	*.***	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
CHK	0.076	11:08	**calibration check**
BLK	0.000	11:09	**blank check**

Test Status *.*** RFI Detected

RESULT: 0.120 g/210L ← **subject's BAC**
11:03 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may <u>not</u> use this instrument report unless you complete a second breath test as specified in the Approved Method. Another 15-minute waiting period is not required.

Approved method for Intox EC/IR II
260 IAC 2-4-2(b)(4):

- If "Mouth Alcohol" is printed on report, perform an additional breath test, beginning with STEP ONE and proceeding through STEP TWELVE

  Another 15-minute waiting period is required

- If "Mouth Alcohol" is printed on report after this additional test sequence:
  - obtain an alternate chemical test for ethanol;
  - perform a breath test on another instrument, or
  - if a numerical value for subject's BAC is printed on a report, check for correct date and time and **sign where indicated**

Test sequence with Mouth Alcohol on first subject sample

```
                    [text omitted]
                Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

          System Check: Passed <-- internal diagnostics

Test      g/210L     Time

BLK       0.000     11:00       blank check
CHK       0.076     11:01       calibration check
BLK       0.000     11:02       blank check
SUBJ      *.***     11:03       1st subject sample test
BLK       0.000     11:04       blank check
CHK       0.076     11:05       calibration check
BLK       0.000     11:06       blank check

   Test Status *.*** Mouth Alcohol

RESULT: *.*** g/210L <-- no BAC reported
     [text omitted]
```

If you get a "Mouth Alcohol" on the first test of a sequence, the sequence will end, and the result will be "Mouth Alcohol." You may not use this instrument report.

Test sequence with Mouth Alcohol on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.*077*
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed ← **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.120	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	*.***	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
CHK	0.076	11:08	**calibration check**
BLK	0.000	11:09	**blank check**

Test Status *.*** Mouth Alcohol

RESULT: 0.120 g/210L ← **subject's BAC**
11:03 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may <u>not</u> use this instrument report unless you complete a second breath test as specified in the Approved Method, beginning with a 15-minute waiting period.

Approved method for Intox EC/IR II
260 IAC 2-4-2(5)

- If "Insufficient Sample" or "Time Out" is printed on report, perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE

Another 15-minute waiting period <u>is not required</u>

- If "Insufficient Sample" or "Time Out" is printed on report after this additional test sequence:
  - obtain an alternate chemical test for ethanol;
  - perform a breath test on another instrument, or
  - if a numerical value for subject's BAC is printed on a report, check for correct date and time and **<u>sign where indicated</u>**

- If "Insufficient Sample" or "Time Out" is caused by subject's lack of cooperation, operator should record that test was refused

- If a numerical value for subject's BAC is printed on a report, check for correct date and time and **<u>sign where indicated</u>**.

Test sequence with Insufficient Sample on first subject sample

```
                [text omitted]
                   Dry Gas Target: 0.077
Lot Number: AG317601 Tank Number: 4 Exp Date: 06/05/2015

          System Check: Passed         internal diagnostics

          Test     g/210L    Time

          BLK      0.000     11:00      blank check
          CHK      0.076     11:01      calibration check
          BLK      0.000     11:02      blank check
          SUBJ     *.***     11:03      1st subject sample test
          BLK      0.000     11:04      blank check
          CHK      0.076     11:05      calibration check
          BLK      0.000     11:06      blank check

          Test Status *.*** Insufficient Sample

          RESULT: *.*** g/210L <-------- no BAC reported
               [text omitted]
```

If you get an "Insufficient Sample" or "Time Out" on the first test of a sequence, the sequence will end, and the result will be "Insufficient Sample" or "Time Out." You may <u>not</u> use this instrument report.

Test sequence with Insufficient Sample on second subject sample

Intox EC/IR-II: Subject Test

ISDT 550 W. 16th Street Indianapolis, IN 46202

Serial Number: 011082 Test Number: *47*
Test Date: 08*/07/2013* Test Time: *10:50 EDT*

Operator Name: Bunion, Paul R
Operator Certification Number: G99999
Agency Name: Skyville
Observation Began: 08*/07/2013 at 10:40*
Observer Name: Bunion, Paul R
Driver License Number: 123456789
Subject Name: Sober, Stone
Subject D.O.B.: 05*/31/1961*

Dry Gas Target: 0.*077*
Lot Number: AG317601 Tank Number: 4 Exp Date: 06*/05/2015*

System Check: Passed **internal diagnostics**

Test	g/210L	Time	
BLK	0.000	11:00	**blank check**
CHK	0.076	11:01	**calibration check**
BLK	0.000	11:02	**blank check**
SUBJ	0.120	11:03	**1st subject sample test**
BLK	0.000	11:06	**blank check**
SUBJ	*.***	11:06	**2nd subject sample test**
BLK	0.000	11:07	**blank check**
CHK	0.076	11:08	**calibration check**
BLK	0.000	11:09	**blank check**

Test Status *.*** Insufficient Sample

RESULT: 0.120 g/210L ← **subject's BAC**
11:04 EDT,
08/07/2013

ALCOHOL READINGS ARE EXPRESSED AS GRAMS OF ALCOHOL PER 210 LITERS OF BREATH

Operator Signature

You may <u>not</u> use this instrument report unless you complete a second breath test as specified in the Approved Method. Another 15-minute waiting period is not required.

Alternate Test

This is a blood test. The sample must be taken by a medical person, but a hospital is not needed.

The drawing of the subject's blood should be witnessed by an officer.

Print Last Test

Press "P" (for "Print")

Press "Enter" key

Type in Password "OPER"

Press "Enter" key

Press "Space" bar to print

Will print only the last test in the instrument memory

Maximum BrAC Result

Intox EC/IR II measures up to 0.440 BrAC

If subject BrAC is >0.440, instrument will display "Sample Over Range"

Get blood if this happens

Laboratory Exercises

You will be required to submit the following instrument reports at the completion of these exercises:

Exercise 1: Personal breath test with duplicate copy

Exercise 2: Subject breath test

Exercise 3: Subject (instructor) breath test

Exercise 1: Complete a personal breath test by delivering two acceptable breath samples during a subject test sequence. Print and sign the instrument report. **Print a duplicate of this instrument report by use of the password protected "Print Last Test" command.**

Exercise 2: Complete a subject test sequence acting as the breath test operator and instructing another student in the delivery of two acceptable breath samples during a subject test sequence.** Print and sign the instrument report.

After completion of the above exercises, turn in your instrument reports to an ISDT instructor, and report to the classroom to take the written examination.

After your completed written examination is graded by an ISDT instructor, report to the laboratory to complete the final laboratory exercise below:

Exercise 3: Complete a subject test sequence acting as the breath test operator and instructing an ISDT instructor in the delivery of two acceptable breath samples during the subject test sequence.** Print, sign, and turn in the instrument report.

**** Emphasis should be placed on coaching the test subject on delivery of the samples in order to minimize the occurrence of "Insufficient sample" test results.**

260 IAC 2-4-2 Approved method for Intox EC/IR II breath analysis

The approved method that shall be followed in making an analysis of breath for ethanol using the Intox EC/IR II breath test instrument is as follows:

STEP ONE: The person to be tested must:

(A) have had nothing to eat or drink;

(B) not have put any foreign substance into his or her mouth or respiratory tract; and

(C) not smoke;

within fifteen (15) minutes before the time the first breath sample is taken or at any time from the taking of the first breath sample until after the taking of the final breath sample.

STEP TWO: Verify that the instrument is in ready mode, as indicated by the instrument display.

STEP THREE: Press "Enter" key to start subject test.

STEP FOUR: Insert identification card into the barcode reader, or press the "Enter" key and use the keyboard to enter the breath test operator information requested by the instrument display.

STEP FIVE: When requested by the instrument display, enter the beginning date and time of the fifteen (15) minute period described in STEP ONE.

STEP SIX: When requested by the instrument display, select "Y" or "N" to indicate whether the breath test operator is the officer with control of the subject during the fifteen (15) minute period described in STEP ONE.

STEP SEVEN: If "N" is selected in STEP SIX, when requested by the instrument display, enter the information of the officer with control of the subject during the fifteen (15) minute period described in STEP ONE.

STEP EIGHT: Enter incident information requested by the instrument display.

STEP NINE: Enter subject information by:

(A) inserting the subject's driver/operator license or identification card into the barcode reader; or

(B) pressing the "Enter" key and using the keyboard to enter the available subject information requested by the instrument display.

STEP TEN: When "Please blow" appears on the instrument display, place a new mouthpiece in the breath tube. Instruct the subject to deliver a breath sample. Remove mouthpiece when prompted by the instrument display and discard.

STEP ELEVEN: When "Please blow" appears again on the instrument display, place a new mouthpiece in the breath tube. Instruct the subject to deliver a breath sample. Remove mouthpiece when prompted by the instrument display and discard.

STEP TWELVE: Print the instrument report and remove it from the printer; check the instrument report for the numerical value of the subject's breath ethanol concentration and the correct date and time and sign the instrument report where indicated.

OVER

If any of the following messages appear on the instrument display or report, proceed as follows:

(1) If **"Please blow"** appears on the instrument display after completion of STEPS ONE through ELEVEN, perform an additional breath test, beginning with STEP ELEVEN. If "No 0.020 Agreement" is printed on the instrument report after this additional breath test:

(A) perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE;
(B) obtain an alternate chemical test for ethanol; or
(C) perform a breath test on another breath test instrument.

(2) If **"Interfering Substance"** is printed on the instrument report, perform an additional breath test, beginning with STEP ONE and proceeding through STEP TWELVE. If "Interfering Substance" is printed on the instrument report after this additional breath test:

(A) obtain an alternate chemical test for ethanol;
(B) perform a breath test on another breath test instrument; or
(C) if a numerical value for the subject's breath ethanol concentration is printed on any instrument report, check the instrument report for the correct date and time and sign the instrument report where indicated.

(3) If **"RFI Detected"** is printed on the instrument report, locate and remove the source of the interference and perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE. If "RFI Detected" is printed on the instrument report after this additional breath test:

(A) obtain an alternate chemical test for ethanol;
(B) perform a breath test on another breath test instrument; or
(C) if a numerical value for the subject's breath ethanol concentration is printed on any instrument report, check the instrument report for the correct date and time and sign the instrument report where indicated.

(4) If **"Mouth Alcohol"** is printed on the instrument report, perform an additional breath test, beginning with STEP ONE and proceeding through STEP TWELVE. If "Mouth Alcohol" is printed on the instrument report after this additional breath test:

(A) obtain an alternate chemical test for ethanol;
(B) perform a breath test on another breath test instrument; or
(C) if a numerical value for the subject's breath ethanol concentration is printed on any instrument report, check the instrument report for the correct date and time and sign the instrument report where indicated.

(5) If **"Insufficient Sample"** or **"Time Out"** is printed on the instrument report, perform an additional breath test, beginning with STEP TWO and proceeding through STEP TWELVE. If "Insufficient Sample" or "Time Out" is printed on the instrument report after this additional breath test:

(A) obtain an alternate chemical test for ethanol;
(B) perform a breath test on another breath test instrument; or
(C) if a numerical value for the subject's breath ethanol concentration is printed on any instrument report, check the instrument report for the correct date and time and sign the instrument report where indicated.

If an "Insufficient Sample" or "Time Out" message is caused by the lack of cooperation of the subject, the breath test operator should record that the test was refused and, if a numerical value for the subject's breath ethanol concentration is printed on any instrument report, check the instrument report for the correct date and time and sign the instrument report where indicated.